"A STUDY TO ASSESS THE EFFECT OF DELAYED CORD CLAMPING ON PHYSIOLOGICAL PARAMETERS OF FULL TERM BABIES BORN BY VAGINAL DELIVERY IN SELECTED HOSPITAL AT COIMBATORE"

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CERTIFICATE

This is to certify that this dissertation titled **"A STUDY TO ASSESS THE EFFECT OF DELAYED CORD CLAMPING ON PHYSIOLOGICAL PARAMETERS OF FULL TERM BABIES BORN BY VAGINAL DELIVERY IN A SELECTED HOSPITAL AT COIMBATORE"** is the bonafide work done by Ms. Kanagavalli.G, R.V.S College of Nursing, R.V.S Educational Trust, Sulur, Coimbatore, submitted to the Tamil Nadu Dr. M.G.R Medical University, Chennai – 32, in partial fulfillment of the requirement for the award of the degree of M.Sc (Nursing) Branch III – Obstetrics and Gynaecological Nursing under our guidance and supervision during the academic period from 2010 – 2012.

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in a selected hospital at Coimbatore"

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ABSTRACT

A study to assess the effect of delayed cord clamping on physiological parameters of full term babies born by vaginal delivery in a selected hospital at Coimbatore.

The aim of the study was to assess whether delayed cord clamping made any difference in the heart rate, respiratory rate, colour, physiological jaundice and haemoglobin level of term newborn babies compared to early cord clamping.

The conceptual frame work used in this study was based on modified Zadek Lewin's change Theory (1930). A quasi experimental two group posttest only design was used. The sample size consisted of 60 parturient mothers in a selected hospital (30 samples in experimental group and 30 in control group), selected by convenient sampling technique. During the second stage of labour the umbilical cord was clamped at 2 minutes after the delivery of the baby in the experimental group and in the control group the umbilical cord was clamped at within 30 seconds after the delivery.

An observational schedule was used to measure the APGAR score and haemoglobin of newborn and a checklist was used to measure the symptoms of physiological jaundice. The data was analyzed by using descriptive and inferential statistics.

Major findings of the study were: The APGAR score of the newborn baby at 1st minute was better in the experimental group. In experimental group all the 30 samples (100%) had no difficulty and adjusted to the extra uterine life at 1st and 5th minute. And in control group 28 samples (93.3%) had no difficulty only 2 samples had moderate difficulty. But at 5th minute all the newborn babies had no difficulty and adjusted to extra uterine life.

On comparison appearance in delayed cord clamping was better than the early cord clamping. The mean score of appearance at 1st minute was 1.13 and at 5th minute was 1.9 and in control group the score was 0.93 and 1.26 respectively.

In the experimental group 13 samples (43.3%) were in the hemoglobin range of 17 – 19 gm/dl and 17 were in the range of 20 – 22 gm/dl. In control group 15 samples (50%) were in both the range of 17 – 19 gm/dl and 20 – 22 gm/dl.

The level of hemoglobin was more in the experimental group when compared to control group due to delayed cord clamping. In the experimental group the mean score of hemoglobin was 19.96 and in control group the score was16.62.

Both in experimental and control group no babies developed the symptoms of physiological jaundice (yellowish skin, yellowish sclera and dark color urine) at 24 hrs. At 36 and 48 hours only 4 – 6 samples (13% – 20%) had the symptoms of physiological jaundice and 24 – 26 samples (80% - 86%) did not show any symptoms of physiological jaundice in both experimental and control group.

There was significant association between hemoglobin level of newborn and age of mother (χ^2=6.35; df=2 P<0.05).

This study concludes that delayed cord clamping will improve the APGAR score and increase the haemoglobin level of newborn and thus decreasing the risk of anemia in later life.

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CHAPTER I

INTRODUCTION

“It’s true that we don’t know we’ve got until we lose it,
but it’s also true that we don’t know why we chose it,
why we ignore! Why we want a bank to store!
When a newborn can get the profit after birth in a cord”

- Erasmus Darwin

BACKGROUND OF THE STUDY:

The umbilical cord is one of the most important organ in an unborn baby's environment. It develops from and contains remnants of the yolk sac. It forms by the fifth week of fetal development, replacing the yolk sac as the source of nutrients for the fetus. The cord connects the maternal blood supply to the fetal blood supply. It carries oxygenated blood and nutrients from the mother, by way of the placenta, to the baby. The blood flow through the umbilical cord is approximately 35 ml / min at 20 weeks, and 240 ml / min at 40 weeks of gestation.

In olden days the labour was conducted by untrained dais in home settings. Soon after the delivery of the baby, umbilical cord was cut and tied with the help of a thread (delayed clamping was followed). Early cord clamping and separation of the umbilical cord from the maternal side prevents some amount of blood from entering into the fetus.

In hospital settings as a routine practice, as soon as the baby is delivered, the umbilical cord is clamped with the help of 2 artery forceps on the maternal and fetal side. The baby is separated by cutting in midst of the 2 artery forceps. After the immediate care of newborn, a plastic clamp is placed 5cm above the baby’s umbilicus. The umbilical stump remains for up to 7–10 days as it dries and then falls off.

In normal physiology the term neonate's fetal pulmonary circulation resistance is high and blood flow is approximately 75 mi/min/kg before the baby takes first breath. When a newborn takes its first breath, the physiological transformation of blood from placenta to newborn's pulmonary respiration takes place over several minutes resulting, the pulmonary circulation resistance to fall down. Therefore most of the output from the right ventricle passes through the lungs.

A normal circulating blood volume is important for maintaining the ventilation and perfusion in the lungs. Applying a clamp to the cord before the pulsation of the cord ceased, results in obstruction of pulmonary circulation and poor venous return to the baby. As a result, the newborn experiences respiratory distress in the extra uterine environment.

ADVERSE EFFECTS OF EARLY CORD CLAMPING

Too early cord clamping results in less physiological blood volume. The normal term child routinely survives but clamping the cord earlier in a compromised child before ventilation is riskier. Initial aeration of the lungs causes reflex dilatation of pulmonary arterioles and a massive increase in pulmonary blood flow. Placental transfusion normally supplies this volume. Clamping the cord before the infant's first breath results in blood being sacrificed from other organs to establish pulmonary perfusion. Fatality may result if the child is already hypovolemic.

Erasmus Darwin (1801) stated that "Another thing very injurious to the child, is the tying and cutting of the umbilical cord too soon. But it should always be left till all pulsation in the cord ceases. As otherwise the child is much weaker than it ought to be, a portion of the blood being left in the placenta, which ought to have been in the child."

Joseph Chilton Pierce (1996) in his book "Magical Child" states that, autopsies of the preterm babies who had early cord clamping showed that early cord clamping produced unusual lesions in the brains of the preterm babies.

Hilary Butler and Dr. Stephen Klasko, (2002) stated that immediate cord clamping is the equivalent of removing one third of an adults total blood supply (10

pints). The placental cord helps in the oxygenation, nutrition and exchange of waste products in the fetus. Even though the cord is usually clamped and cut after the delivery of the baby, it needs the full amount of blood for maintaining intracranial pressure, blood volume and to decrease the risk of anemia in later life. Hence he concluded that immediate cord clamping should be called "unethical premature cord clamping". Delayed cord clamping should be renamed "normal" or "appropriate cord clamping".

BENEFITS OF DELAYED CORD CLAMPING:

Iron status of infants is based on their total body iron content at birth. Timing of clamping of the umbilical cord can affect the volume of blood transferred from the placenta to the newborn and have effect on the iron content also. Delayed clamping of the umbilical cord might prevent or slow the onset of iron deficiency by increasing the infant's iron content at birth. Compared with early clamping, a delay of around 2–3 min provides an additional 40 ml of blood per kg of bodyweight. For a 3.2kg infant with a haemoglobin concentration of 170 g/L at birth, this additional blood amounts to an additional 75 mg of iron added to iron stores, sufficient to meet the needs of a 6–11 month old infant for more than 3 months. However, the types of interventions that can be implemented during this time are limited.

Yao and Lind (1986) stated that if after the delivery, the newborn is placed at or below the level of vaginal introitus for 3 min and the fetoplacental circulation is not immediately occluded by cord clamping, an average of 80 ml of blood may shifted from the placenta to the neonate. This provides approximately 50 mg of iron, which reduces the frequency of iron deficiency anaemia, later in infancy.

It also found that delayed cord clamping at 1st min after birth increased the newborn haemoglobin concentration 2.2 g/dl compared with clamping within 30 sec.

The transplantation of stem cells naturally occurs in nature at birth in mammals via the umbilical cord. A delay in the cord blood clamping may increase the stem cell supply to the baby, thereby allowing an innate stem cell therapy that can promote acute benefits in the case of neonatal disease, as well as long-term benefits against age-related

diseases. One important point to consider is the long-term effects of delayed cord clamping.

It is interesting that scientists are now discovering that umbilical cord blood is full of valuable T-cells that have cancer fighting properties. A whole industry has sprung up to have this precious blood extracted from the placenta, put in a cooler with dry ice, and taken to a special storage facility to be ready in case the child gets cancer at some time in the future. This is human insanity of the first order. That blood is designed by nature to go into that child's body at birth, not 30 years later.

NEED FOR THE STUDY:

The umbilical cord is clamped immediately (or) within the first 15 seconds after delivery of the baby. There is no sound scientific evidence to support this practice. There was a belief that delayed cord clamping causes adverse effects that is cardio pulmonary diseases, and hyperbilirubinemia in newborn infants as a consequence of placental transfusion. Recent randomized controlled trials reviewed that there are no harmful (or) adverse events in delayed cord clamping.

Whenever a pulsating umbilical cord is clamped, 20-60% of the baby's total blood volume is trapped inside the placenta. A nine pound baby manufactures only 10 ounces of blood during gestation. It will take over 6 months for the baby to replenish the volume of blood lost by early cord clamping. In essence, newborns become involuntary blood donors. Half of their blood volume is lost when their cords are early clamped.

It decreases in necessary blood volume causes the babies to become anaemic. In most cases, the anaemia is not diagnosed and the infant is sent home in a weakened state, more susceptible to a host of complications, including sudden infant distress syndrome. Restricted umbilical cord problems associated with anaemia are autism, heart perforations, thyroid disorders, brain tumours, leukemia, hormonal imbalances and liver/kidney disease.

The researcher visited the various hospitals in different places. There the practice was the umbilical cord is clamped immediately or within the first 15 seconds after delivery of the baby. Physiological studies have shown that there is a transfer of 80 ml of

blood from the placenta at 1 min after birth, reaching about 100 ml at 3 min after birth. These additional volumes of blood can supply extra iron amounting to 40-50 mg/kg of body. In the above view the investigator would like to study about the effect of delayed cord clamping on physiological parameters of the newborn. This research will help further researchers to take some action in this area to improve the well being of the newborn.

STATEMENT OF THE PROBLEM:

A study to assess the effect of delayed cord clamping on physiological parameters of full term babies born by vaginal delivery in selected hospital at Coimbatore.

AIM OF THE STUDY:

To assess whether delayed cord clamping make any difference in the heart rate, respiratory rate, colour, physiological jaundice and haemoglobin level of term newborn babies compared to early cord clamping.

SPECIFIC OBJECTIVES:

1. To assess and compare the level of APGAR score of term newborn babies at 1^{st} and 5^{th} min after the birth of the baby in experimental and control group.
2. To assess and compare the parameters of APGAR score (heart rate, respiratory effort and appearance) of term newborn babies at 1^{st} and 5^{th} min after the birth of the baby in experimental and control group.
3. To assess and compare the haemoglobin level of term newborn babies in experimental and control group.
4. To assess and compare the symptoms of physiological jaundice of term newborn babies in experimental and control group.

5. To associate the haemoglobin level of term newborn babies with the demographic variables.

RESEARCH HYPOTHESES:

H1: There is a significant difference between the mean APGAR score of newborn babies in experimental and control group at 1 min and at 5 min.

H2: There is a significant difference between the mean score of parameters of APGAR score (appearance, heart rate and respiratory effort) of newborn babies in experimental and control group.

H2.a: There will be a significant difference in the appearance of newborn baby at 1st and 5th between experimental and control group is accepted.

H2.b: there will be a significant difference in the heart rate of newborn baby in 1st minute between experimental and control group is accepted.

H2.c: There will be a significant difference in the respiratory effort of newborn baby at 1st minute between experimental and control group is accepted.

H3: There is a significant increase in mean haemoglobin level of newborn babies in experimental group compared to control group.

OPERATIONAL DEFINITIONS:

1. **Early cord clamping:** In early cord clamping the clamp is applied to the umbilical cord within 30 sec of the birth of the baby.
2. **Delayed cord clamping:** In delayed cord clamping the clamp is applied to the umbilical cord at 2 min after birth of the baby.

3. **Physiological parameters:** Physiological parameters are the measurements of human physiological functions are human response to such environmental factors. It includes haemoglobin level, heart rate, respiratory rate, colour and physiological jaundice.
    - **Haemoglobin value:** Haemoglobin level is measured by hemoglobinometer. The normal haemoglobin value on newborn is 14-22 mg/dl.
    - **Heart rate:** Heart rate is measured by stethoscope.
    - **Respiratory rate:** Respiratory rate is measured by observation.
    - **Colour:** Colour is assessed by observation of the newborn skin.
    - **Physiological jaundice:** Physiological jaundice is assessed by the symptoms of yellowish skin, yellowish sclera and dark colour urine.
4. **Full term babies:** After 37 weeks of gestation, the baby is considered as full term babies.
5. **Vaginal delivery:** Birth of the fetus through the vagina.

ASSUMPTIONS:

The delayed cord clamping will increase the haemoglobin level and imrove APGAR score level of term newborn babies.

DELIMITATION:

The study is delimited to,

- The babies born at the gestational period of 37 – 40 weeks by normal vaginal delivery.
- One hospital.

SCOPE OF THE STUDY:

This study will help to assess the APGAR score, level of haemoglobin and presence and absence of physiological jaundice symptoms by early and delayed cord

clamping. If there is improvement in the APGAR score, increased level of haemoglobin and absence of physiological jaundice it shows the effectiveness of delayed cord clamping. Clamping the cord at 2 minutes after the birth of the baby will be beneficial to prevent the anemia in their later life. It can be easily implemented in to the practice.

CONCEPTUAL FRAME WORK

Conceptual frame work refers to interrelated concepts or abstractions that are assembled together in some rational scheme by virtue of their relevance to a common theme **(Polit Hungler - 1997).**

Theoretical model for this study was derived from Callista Roy's Adaptation Theory (1996). Roy employs a feedback cycle of input, throughput, and output. Input is identified as stimuli, which can come from the environment or from within a person. Stimuli are classified as focal (immediately confronting the person), contextual (all other stimuli, that are present) or residual (nonspecific such as cultural beliefs or attitude about illness). Input also includes a person's adaptation level (the range of stimuli to which a person can adapt easily. Through input we can make use of a person's processes and effectors. "Process" refers to the control mechanisms that a person uses as an adaptive system. "Effectors" refers to the physiological function, self-concept, role function and interdependence involved in adaptation.

In the adaptive system, the term "system" is defined as self-parts connected to function as a whole for some purpose and it so by virtue of the interdependence of its parts. This has two major internal control process called "regulator" and "cognator".
Regulator sub system consists of internal process including chemical, neutral, and endocrine – transmit the stimuli, causing output – physiological response, cognator sub system regulates self-concepts, role function and inter dependence.

Output is the outcome of the system; when the system is a person, output is categorized as adaptive responses (Those that promote a person's integrity) or ineffective

responses (those that do not promote goal achievement) these responses provide feedback for the system.

The modified model in this study explains the input as the focal stimuli namely degreased haemoglobin level, poor wellbeing (APGAR score), and presence or absence of symptoms of physiological jaundice in newborn. The contextual stimuli are, Age, Gestational Age, Gravid, Parity of the mother and Birth Weight and Sex of the baby. The coping mechanism of the cognator subsystem occurs as a result of delayed cord clamping. The experimental group is subjected to delayed cord clamping. The adaptive responses among the experimental group of newborn babies show improvement in the wellbeing (APGAR score), increased haemoglobin level and presence or absence of symptoms of physiological jaundice. The control group subjected to the early cord clamping may not show an effective adaptation.

Figure – 1 highlights the conceptual framework based on modified Roy's adaptation model (1996).

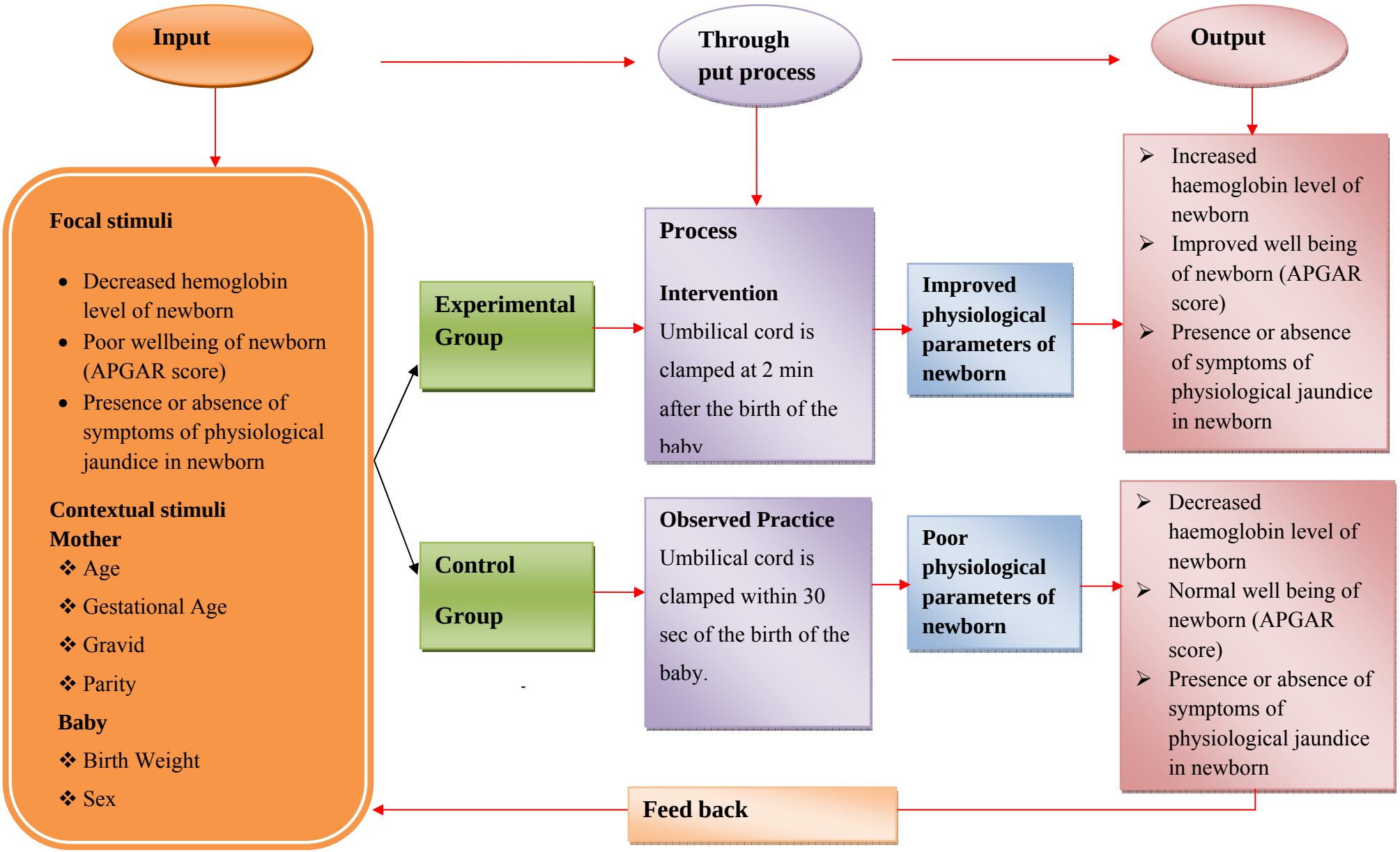

FIGURE – 1: CONCEPTUAL FRAMEWORK BASED ON MODIFIED ROYS ADAPTATION MODEL (1996)

CHAPTER II

REVIEW OF LITERATURE

The review of literature in a research report is a summary of current knowledge about a particular practice problem (Nancy and Burns 2002). A literature review is an organised writer's presentation of what has been published on a topic by the scholars. The task of reviewing literature involves the identification, selection, critical analysis and reporting of existing information on the topic of interest.

The literature found to be relevant and useful for the present study findings are presented here,

Literature related to delayed cord clamping.

Nelle M, et.al, (1995) conducted a study to assess the effect of Leboyer childbirth (the newly born infant is placed on the mother's abdomen and the cord is clamped when it stops pulsating) on cardiac output, cerebral and gastrointestinal blood flow velocities in full-term neonates. This study was done to assess the effect of Leboyer childbirth on neonatal circulation during the first 5 days after birth. Haematocrit, blood viscosity, left and right ventricular output, and cerebral blood flow velocities in the arteria carotis interna, arteria cerebri anterior, and truncus coeliacus were studied in 15 full-term neonates with early (less than 10 seconds) cord clamping and 15 full-term neonates delivered according to Leboyer (cord clamping after 3 minutes) on day 1 (2 to 4 hours after birth) and day 5.

The fetal placental blood volume decreased from 42 +/- 8 mL/kg of neonatal body weight after early cord clamping to 19 +/- 7 mL/kg after Leboyer delivery. Neonatal blood volume, calculated from the fetal placental blood volume, was 32% higher in the Leboyer group compared with the early cord-clamped infants. In the infants with early cord clamping, haematocrit, and blood viscosity did not change significantly during the first 5 days. After Leboyer birth, the heamatocrit rose from 0.51 +/- 0.05 in cord blood to

0.62 +/- 0.06 at 2 to 4 hours of age, thereby increasing blood viscosity by 32%. Stroke volume, heart rate, cardiac output, left-to-right shunt across the ductus arteriosus, and blood flow velocity in the truncus coeliacus were similar in both groups and did not change during the first 5 days.

Ruban Grajeda and Rafael Perez (1995) conducted a comparative study to determine whether delayed cord clamping improves the haematological status of the infants at 2 months of age. 69 infants were selected for the study. Out of 69, 21 were assigned to immediately cord clamping after the delivery, 26 were assigned to clamping when cord stopped pulsating with the infant placed at the level of the placenta and 22 were assigned to clamping when cord stopped pulsating with the infant placed at below the level of the placenta.

The result of the study revealed that 2 months after delivery, infants in the two groups with delayed cord clamping had significantly higher haematocrit values and haemoglobin concentrations compared to early cord clamping. The percentage of haematocrit values was 38% in control group compared with 42% in group 2 and 55% in group 3. These results suggest that waiting until the cord stops pulsating more than 1 minute after the delivery is the low-cost intervention that can reduce anaemia in infants in developing countries.

Dr. S. Ramji (2001) conducted a comparative study to assess the effects of cord clamping on iron stores of infants born to anaemic mothers at 3 months of age. The samples were selected by random sampling technique. Of 102 neonates 43 were assigned to early cord clamping and 59 were assigned to delayed cord clamping. The groups were comparable for maternal age, parity, weight and supplemental iron intake, infant's birth weight, gestation and sex. The results of the study show that the mean infant ferritin and haemoglobin at 3 months were significantly higher in the delayed clamping group (118.4 µg/L and 99 g/L) than in the early clamping group (73 µg/L and 88 g/L). So iron stores and haemoglobin in infancy can be improved in neonates born to anaemic mothers by delaying cord clamping at birth.

Mercer JS, et.al, (2003) conducted a pilot study to assess the immediate versus delayed cord clamping effects on initial blood pressure and glucose level in infants born between 24 and 32 weeks. The samples, 32 infants were randomly assigned to immediate cord clamping group (cord clamped at 5 to 10 seconds) or delayed cord clamping group (cord clamped at 30 to 45 seconds). The results of the study showed that the delayed cord clamping group had higher initial mean blood pressures. Delayed cord clamping group infants had higher initial glucose levels (73.1 mg/dl) when compared to immediate cord clamping group (36 mg/dl).

Strauss RG, **et.al, (2003)** conducted a study to compare immediate versus delayed clamping of the umbilical cord in preterm infants on RBC volume and Score for Neonatal Acute Physiology. Neonates not more than 38 weeks gestation were randomly assigned to cord clamping immediately at 1 minute after delivery. The results of the study showed that circulating RBC volume/mass increased and weekly haematocrit values were higher after delayed cord clamping. APGAR score after birth and daily Score for Acute Neonatal Physiology score were not significantly different.

Camila M Chaparro, et.al, (2004) conducted a comparative study to assess the effect of timing of umbilical cord clamping on iron status in infants. 476 mother-infant pairs were recruited and randomly assigned to delayed clamping (2 min after delivery of the infant's shoulders) or early clamping (around 10 s after delivery), and followed up until 6 months postpartum. At 6 months of age, infants who had delayed clamping had significantly higher mean corpuscular volume (81·0 fL *vs* 79·5 fL), ferritin (50·7 μg/L *vs* 34·4 μg/L), and total body iron. The effect of delayed clamping was significantly greater for infants born to mothers with low ferritin at delivery, breastfed infants not receiving iron fortified milk or formula, and infants born with birth weight between 2500 g and 3000 g. This study concluded that a cord clamping delay of 2 minutes increased 6-month iron stores by about 27–47 mg.

Jose´ M. Ceriani Cernadas, MD (2005) conducted a comparative study to assess the effect of timing of cord clamping on neonatal venous haematocrit values and clinical

outcome at term. This was a randomized, controlled trial performed in 2 obstetrical units in Argentina on neonates born at term without complications to mothers with uneventful pregnancies. After written parental consents were obtained, newborns were randomly assigned to cord clamping within the first 15 seconds (group 1), at 1 minute (group 2), or at 3 minutes (group 3) after birth. The infants' venous haematocrit value was measured 6 hours after birth. Two hundred seventy-six newborns were recruited. Mean venous haematocrit values at 6 hours of life were 53.5% (group 1), 57.0% (group 2), and 59.4% (group 3). The result of the study showed that delayed cord clamping at birth increases neonatal mean venous haematocrit within a physiologic range. No harmful effects were observed among groups. Furthermore, this intervention seemed to reduce the rate of anemia.

Judith S. Mercer, et.al, (2005) conducted a comparative study to assess the effects of immediate and delayed cord clamping on very low birth weight infants on bronchopulmonary dysplasia and suspected necrotizing enterocolitis, late-onset sepsis and intraventricular haemorrhage. The sampling technique used in this study was random sampling technique. Seventy two women in labor with singleton fetuses <32 weeks gestation were randomly assigned to immediate cord clamping (cord clamped at 5–10 seconds) or delayed cord clamping (30–45 seconds) groups.

The results of the study showed that the mean weight of infants in the immediate cord clamping and delayed cord clamping groups were 1151 and 1175 g, and mean gestational ages were 28.2 and 28.3 weeks, respectively. There were no differences in the broncho pulmonary dysplasia and suspected necrotizing enterocolitis. However, significant differences were found between the immediate and delayed cord clamping groups in the rates of intra ventricular haemorrhage and late onset of sepsis. Two of the 23 male infants in the delayed cord clamping group had intra ventricular haemorrhage versus 8 of the 19 in the immediate cord clamping group. No cases of sepsis occurred in the 23 boys in the delayed cord clamping group, whereas 6 of the 19 boys in the immediate cord clamping group had confirmed sepsis. So delayed cord clamping seems to protect very low birth weight infants from intra ventricular haemorrhage and late onset of sepsis, especially for male infants.

UC Davis (2006) conducted a 16 month long study to evaluate whether delayed clamping improves iron status of full-term, normal-birth-weight infants during their first six months. A total of 476 normal-weight, full-term infants and their mothers were included in the study. Each mother-child pair was randomly assigned to the umbilical cord clamped at either 10 seconds or two minutes after the baby's shoulders were delivered. Data on the infants' diet, growth and illnesses were collected when the children were 2, 4 and 6 months old. Iron status of the babies also was measured at birth and at the end of the study. The study revealed that a two-minute delay in cord clamping at birth significantly increased the child's iron status at 6 months of age, and it documented for the first time that the beneficial effects of delayed cord clamping last beyond the age of 3 months.

UNICEF (2006) conducted a comparative study to evaluate the possible risks of delayed cord clamping in newborns and their mothers. A total of 276 mothers–infant pairs were randomly assigned to three groups with different timing of cord clamping; the first 15 seconds (early cord clamping), at one minute, or at three minutes (both groups defined as delayed cord clamping). The results of the study showed that delayed cord clamping increased haematocrit during the first six hours of life within physiological ranges and did not cause any risks in either the newborn or the mothers. Also, delayed cord clamping significantly decreased the incidence of neonatal anaemia, defined as a venous haematocrit value less than 45% and the levels of serum ferritin were significantly higher in the group with delayed cord clamping.

De Paco Matallana (2007) conducted a comparative study to evaluate whether delayed cord clamping increase partial pressure of oxygen in newborn babies. The random sampling technique was used in this study, where 151 umbilical cords of newborns from full-term pregnancies were analyzed. Out of 151 cases, 79 umbilical cord were cut within 20 seconds, and 72 cases clamped at 2 minutes after the infant was delivered. The results of the study showed that the partial pressure of oxygen in the umbilical artery of the newborn babies who had late clamping had risen, while there was

a lesser need of oxygenotherapy after birth. There were no differences in the removal time of the placenta and the mother's bleeding after birth.

Rabe, et.al, (2007) conducted a comparative study on milking the umbilical cord and delayed cord clamping increase placental transfusion in preterm neonates before 33 weeks of gestation. The sample size was 58 preterm neonates. The sampling technique used in this study was random sampling technique. Out of 58 neonates, 31 were randomly assigned to cord clamping and 27 were assigned to repeated milking of the cord. The results of the study showed that mean birth weight was 1,263g in the clamping group and 1,235g in the milking group, with mean gestational age of 29.2 weeks and 29.5 weeks, respectively. Mean haemoglobin values for each group at 1 hour after birth were 17.3 g/L for clamping and 17.5 g/L for milking. There was no significant difference in number of neonates undergoing transfusion (clamping group, 15; milking group, 17).

Baenziger O, et.al, (2007) conducted a comparative study to investigate the effect of placentofetal transfusion on cerebral oxygenation in preterm infants by near-infrared spectroscopy. A total of 39 preterm infants with a median gestational age of 30.4 weeks were randomly assigned to an experiment group (n = 15) and a control group (n = 24). The delivery of the infants in the experiment group was immediately followed by maternal administration of syntocinon, the infant was placed 15 cm below the placenta, and cord clamping was delayed by 60 to 90 seconds. The infants in the control group were delivered conventionally. At 4 and 24 hours, cerebral haemoglobin concentrations, cerebral blood volume, and regional tissue oxygenation were measured by near-infrared spectroscopy. The results of the study showed that cerebral blood volume was not different between the 2 groups at 4 hours (6.1 vs 5.8 ml/100 g of tissue) nor at 24 hours (6.2 vs 6.2 ml/100 g of tissue). Mean regional tissue oxygenation of the experiment group was higher at the ages of 4 hours (69.9% vs 65.5%) and of 24 hours (71.3% vs 68.1%). This study concluded that delayed clamping of the umbilical cord improves cerebral oxygenation in preterm infants in the first 24 hours.

Kugelman A, et.al, (2007) conducted a comparative study to assess delayed versus immediate cord clamping on higher blood pressure (BP) and hematocrit (Hct), and to assess its clinical effects on the neonatal course in premature neonates (< 35 weeks). In that study 35 neonates were randomly assigned to immediate cord clamping (ICC) at 5 to 10 seconds, and 30 neonates were randomly assigned to delayed cord clamping (DCC) at 30 to 45 seconds. The results of the study revealed that the delayed cord clamping group tended to have higher initial diastolic BP and higher haematocrit (especially in vaginally delivered neonates). Infants weighing < 1500 g with delayed cord clamping tended to have higher mean BP, and needed less mechanical ventilation and surfactant compared with immediate cord clamping neonates. Infants with delayed cord clamping did not experience more polycythemia (Hct > 60%), but had a trend toward higher bilirubin levels with no differences in the phototherapy needs. Delayed cord clamping seems to be safe and may be beneficial when compared with immediate cord clamping in premature neonates.

McDonald SJ and Middleton P, (2008) conducted a comparative study to assess effect of timing of umbilical cord clamping of term infants on maternal and neonatal outcomes. The size of the sample was 2989 and the samples were selected randomly. The results of the study showed that no significant differences between early and late cord clamping on postpartum haemorrhage or severe postpartum haemorrhage in any of the sample. For neonatal outcomes, there was a significant increase in newborn haemoglobin levels in the late cord clamping group compared with early cord clamping (mean difference 2.17 g/dL). Infant ferritin levels remained higher in the late clamping group than the early clamping group at six months.

Kugelman A and Borenstein-Levin L, (2009) conducted a comparative study to evaluate the immunologic and infectious consequences of delayed versus immediate cord clamping in premature infants (<35 weeks) during the neonatal period. In that study 35 infants were randomly assigned to immediate cord clamping (ICC) at 5-10 s and 30 infants to delayed cord clamping (DCC), at 30-45 s (14 and 15 infants in each group were <1500 g, respectively).the results of the study show that there was no significant

difference between the ICC and DCC groups in the complement or in the immunoglobulin levels. All were within the normal range for age. All infectious parameters (events of sepsis or "rule-out sepsis", days of antibiotic therapy, and number of antibiotic courses during hospitalization and infections within the first month of life in cases of earlier discharge) were comparable in both groups. Similar results were found in the subgroup of infants <1500 g. this study concluded that delayed compared to immediate cord clamping did not affect the immunologic or the infectious status of infants born at <35 weeks during the neonatal period.

Michael P Meyer and Lindsay Mildenhall, **(2011)** conducted an observational study to determine if timing of cord clamping affects blood flow in the upper body, as measured by flow in the superior vena cava (SVC). The sample size was 30 preterm neonates. Among that 17 were randomly assigned to immediate cord clamping group (cord clamped at 5 to 10 seconds) and 13 were assigned to late clamping group (cord clamp at 30 to 45 seconds). The results of the study showed that infants in the two groups did not differ significantly in terms of gestational age, gender or use of antenatal steroids. Median flow in the SVC in the first 24 hrs was significantly higher in the group with delayed clamping (mean 91 ml/kg/min) compared with the immediate clamping group (52 ml/kg/min).

CONCLUSION:

The review of literature enlightened the investigator to develop an insight about the neonatal outcomes and delayed cord clamping. In this review many studies were conducted on the effect of delayed cord clamping on neonatal outcomes. This review helped the investigator to gain in depth knowledge of the research problem and guided in designing the study.

CHAPTER- III

RESEARCH METHODOLOGY

Methodology of research organizes all the components of the study in a way that is most likely to lead to valid answer to the problems that have been posed **(Burns and Grove 2002)**. It refers to various logical steps that are generally adopted by the investigator in studying the research problem.

This chapter deals with the methodology to assess the effect of delayed cord clamping on physiological parameters of full term babies born by vaginal delivery in selected hospital at Coimbatore. It includes research design, setting, population, sample, and sampling technique, sampling criteria , description and construction of tool, pilot study, data collection procedure and data analysis.

RESEARCH APPROACH

The research approach is an overall plan chosen to carry out the study. The selection of research approach is the basic procedure for the conduction of research inquiry. An evaluative approach was used in this study, as the study aimed at assessing the effect of delayed cord clamping on physiological parameters of full term babies born by vaginal delivery.

RESEARCH DESIGN

For the present study, a quasi experimental two group post test only design with repeated observation was considered most appropriate.

Experimental Group: X1→O1→O2→O3→O4→O5→O6

Control Group: X2→O1→O2→O3→O4→O5→O6

X1: Delayed cord clamping for the experimental group

X2: for the control group the standard method of early cord clamping was used.

O1 – O6: Observation of experimental and control group

O1: Observation of APGAR score at 1 min after delivery

O2: Observation of APGAR score at 5 min after delivery

O3: Observation of haemoglobin level at 2 hrs after delivery

O4: Observation of symptoms of physiological jaundice at 24 hrs after delivery

O5: Observation of symptoms of physiological jaundice at 36 hrs after delivery

O6: Observation of symptoms of physiological jaundice at 48 hrs after delivery

VARIABLES IN THE STUDY

In this study delayed cord clamping was the independent variable and physiological parameters of newborn were dependent variable (APGAR score, haemoglobin level and symptoms of physiological jaundice).

SETTINGS OF THE STUDY

"Setting" refers to the area where the study is conducted. The study was conducted in a Government hospital at Coimbatore.

The total bed strength of the hospital is 750. The hospital has equipped with all specialties and well equipped labour setting attaché with neonatal resuscitation room. The labour room has 3 rooms, each room having 2 labour tables. The mothers are referred for admission to the labour room by the consultant on the basis of expected date of delivery and labour pain. At 4 cm cervical dilatation the mothers are shifted to the labour table. The routine practice after the delivery of the baby is keeping the baby on the mother's abdomen soon after the delivery and the cord is clamped by artery forceps both on maternal and fetal side in between that the cord is cut within 30seconds.

POPULATION

All the parturient mothers having gestational weeks of 37 – 40 and admitted in the labour ward for delivery in the selected hospital at the time of study.

SAMPLE SIZE

Sample refers to a subset of population that is selected to participate in a particular study **(Burns and Grove 2002).**

The sample consisted of 60 term newborns (control – 30, experimental – 30) born by normal vaginal delivery.

SAMPLING TECHNIQUE

Convenient sampling technique was used to select the samples. The samples meeting the inclusion criteria were included for the study according to the availability of the sample.

SAMPLING CRIETERIA

Inclusion criteria:

- Only term newborns born by normal vaginal delivery.
- Mothers who were willing to participate.

Exclusion criteria:

- Caesarean delivery
- Mothers with complication (PIH, Eclampsia, GDM, Multiple pregnancies etc.)
- High risk newborn.

DESCRIPTION OF THE TOOL

The tool used for the collection of the data was a structured interview schedule, an observation schedule and an observational check list.

A. Structured interview schedule

The interview schedule was designed to collect demographic information such as age, sex, gestational weeks, gravid, parity, sex and birth weight of the baby.

B. Observational schedule

a. Observational schedule for assessing the APGAR score

The **Apgar score** was devised in 1952 by the Dr. Virginia Apgar as a simple and repeatable method to quickly and summarily assess the health of newborn immediately after birth. The Apgar score is determined by evaluating the newborn baby on five simple criteria on a scale from zero to two, then summing up the five values thus obtained. The resulting Apgar score ranges from zero to 10. The five criteria are summarized using words chosen to form (**A**ppearance, **P**ulse, **G**rimace, **A**ctivity, and **R**espiration.)

The test is generally done at one and five minutes after birth, and may be repeated later if the score is and remains low.

b. Observation schedule for assessing hemoglobin level of newborn.

The normal range of haemoglobin level of newborn is 14 – 22 mg/dl.

The haemoglobin level of newborn was checked by Sahli's haemometer at 2 hours after the delivery was documented in the observation schedule.

C. Observational checklist

The observational Check list was prepared for assessing the presence of symptoms of physiological jaundice (three colors was practiced for observing and recording of the symptoms at 24, 36 and 48 hours) after the delivery. The symptoms included were yellowish skin, yellowish sclera and dark color urine.

SCORING AND INTERPRETATION OF SCORING

1. Assessing APGAR score

Scoring:

Each parameter is scored as 0, 1 and 2 based on the criteria.

1. Heart rate

   Absent – 0

   <100 bpm – 1

   >100 bpm – 2
2. Respiratory effort

   Absent – 0

   Slow, irregular – 1

   Good, crying – 2
3. Muscle tone

   Flaccid – 0

   Some flexion of extremities – 1

   Active motion – 2
4. Reflex irritability

   No response – 0

   Grimace – 1

   Vigorous cry – 2
5. Appearance

   Blue, pale – 0

   Body pink, extremities blue – 1

   Completely pink

The score was interpreted as,

Total APGAR for a normal newborn is 7 to 10.

0 – 3: severe distress

4 – 6: moderate difficulty

7 – 10: no difficulty, adjusting to extra uterine life.

2. Assessing presence of physiological symptoms of newborn

A score of 1 was assigned for the presence of a symptoms and zero score was assigned for the absence of the symptoms.

DEVELOPMENT OF THE TOOL

The tool was developed based on the objectives of the study, Review of literature and discussion with experts.

VALIDITY OF THE RESEARCH TOOL

In order to establish the content validity the research tools including the objective of the study along with the criteria check list were submitted to 2 medical experts (MBBS DGO and MBBS DCH) working as chief consultant in one of the private hospital, 3 nursing experts with Masters qualification in Nursing in OBG specialty among which 2 nursing experts were working as principal in private college and one expert was working as Nursing Superintendent in a private hospital. Based on the suggestions given by the experts weight and sex of the newborn baby was added in the demographic data.

RELIABILITY OF THE RESEARCH TOOL

The reliability of the research tool was tested by inter rater method. The test was administered to 10 patients. Correlation co-efficient was calculated by Karl Pearson correlation method. The reliability of haemoglobin was 0.952 and symptoms of physiological jaundice were 1. The parameters of APGAR score were assessed by APGAR scale. It is a standardized tool tested and proven to be reliable 0.995, which confirmed that there was high positive correlation and internal consistency of the tools.

PILOT STUDY REPORT

A pilot study was conducted in the same selected hospital to test the feasibility of the study. Permission was obtained from the concerned authority of the hospital. Ten samples were taken from the patients who were admitted in labour ward of the hospital. The first sample was selected by convenient sampling technique and assigned to the experimental group. There after alternative sample was assigned to the control group.

After introducing self, the researcher explained the purpose and nature of the study to the samples and requested for kind participation. After developing the rapport the researcher collected the information regarding the demographic data by interviewing the sample. In control group, the usual method of cord clamping that is cord clamped at within 30 seconds after the delivery. Then the research observed the parameters of APGAR score (appearance, heart rate and respiratory effort) at 1 and 5 min by using the standard tool and checked the hemoglobin value of newborn babies 2 hrs after delivery. Then the researcher observed the symptoms of physiological jaundice at 24, 36 and 48 hrs after the birth. In the Experimental group the new intervention was followed that is cord clamped at 2 min after the delivery. Parameters of APGAR score, haemoglobin and physiological jaundice symptoms was observed as same like in the control group. The total period of data collection was 5 days.

DATA COLLECTION PROCEDURE

Before commencement of data collection once again the permission for the main study was obtained from the Head of Obstetrics and Gynecology Department of the selected hospital. Then the investigator also met the Nursing Superintendent and established adequate rapport with the labour ward staff and briefed the research study in order to get their co-operation to conduct the study.

The investigator selected the mothers during active phase of first stage of labour developed the rapport with the mother and met all the basic needs. The samples those who fulfilled the inclusion criteria were selected by convenient sampling technique. The investigator gave explanations regarding the study to each mother and her family members and obtained verbal consent from them. The first sample was selected by convenient sampling technique and assigned to the experimental group. there after alternative sample was assigned to the control group.

In control group, cord was clamped at within 30 seconds after the birth of the baby. Then the researcher observed the parameters of APGAR score (appearance, heart rate and respiratory effort) at 1 and 5 min by using the observational schedule and checked the hemoglobin value of newborn babies 2 hrs after delivery by Sahli's

haemometer. Then the researcher observed the symptoms of physiological jaundice of the experimental and control group at 24, 36 and 48 hrs after the birth in the postnatal ward.

In the Experimental group cord was clamped at 2 min after the birth of the baby. All the parameters of APGAR score and haemoglobin was observed as for the control group. The total period of data collection was 45 days (22.08.2011 to 10.10.2011). The mothers were co-operative throughout the study.

PLAN FOR DATA ANALYSIS

The data obtained were analyzed using descriptive and inferential statistics.

Descriptive statistics

Frequency and percentage distributions were used to analyze demographic variables.

Mean and mean score percentage was used to determine the difference in the level of APGAR score and haemoglobin.

Inferential statistics

Unpaired‘t’ test was used to determine the significant difference in the level of APGAR score and haemoglobin.

‘χ^2’ test was used to assess the association of demographic variables with haemoglobin level.

ETHICAL CONSIDERATION

Nature, purpose, type of the study and intervention were explained and obtained, the written consent from the ethical committee and higher authorities of the hospital. Explained to the samples and privacy and comfort of the samples were maintained throughout the study. Adequate explanation was given whenever they asked questions, and records were maintained for each sample.

CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

Data analysis is conducted to reduce, organize and give meaning to the data. Analysis technique in quantitative research includes descriptive and inferential analysis.

This chapter deals with the analysis and interpretation of data collected from 60 parturient mothers from a selected hospital at Coimbatore.

The data have been presented under the following sections

Section – I Demographic characteristics of the sample

Demographic characteristics of the sample have been presented in relation to personal characteristics which include age, gestational age, gravida, parity, weight and sex of the baby.

Section - II Assessment of physiological parameters of newborn

This analysis has been done comparatively for the experimental and control group according to the parameters, the level of APGAR score and haemoglobin in frequency and percentage. Also the analysis has been done in mean score and significant difference between the experimental and control group.

Section – III Assessment of symptoms of physiological jaundice in newborn babies

This analysis has been done comparatively for the experimental and control group in symptoms of physiological jaundice in newborn babies.

Section – IV Association of selected demographic variables with the hemoglobin level of newborn babies.

This section presents the association of demographic variables with the hemoglobin level of newborn in experimental and control group.

SECTION – I

DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE

TABLE -I

FREQUENCY AND PERCENTAGE OF EXPERIMENTAL AND CONTROL GROUP ACCORDING TO DEMOGRAPHIC VARIABLES

N = 60

Sl. No	Characteristics	Experimental group N=30		Control group N=30	
		F	%	f	%
1.	**Age in years**				
	a) 18 – 21	16	53.30	14	46.70
	b) 22 – 26	12	40.00	14	46.70
	c) 27 – 30	2	6.70	2	6.70
2.	**Gestational age**				
	a) 37 – 38 weeks	9	30.00	17	56.70
	b) 39 – 40 weeks	21	70.00	13	43.30
3.	**Gravida**				
	a) Gravida 1	22	73.30	16	53.30
	b) Gravida 2	6	20.00	6	20.00
	c) Gravida 3	2	6.70	8	13.30
	d) More than 3 Gravida	-	-	-	-
4.	**Parity**				
	a) Parity 0	22	73.30	21	70.00
	b) Parity 1	8	26.70	5	16.70
	c) Parity 2	-	-	4	13.30
	d) More than parity 2	-	-	-	-
5.	**Weight of the baby in kg**				
	a) 2.5 – 3 kg	18	60.00	26	86.70
	b) 3.1 – 3.5 kg	11	36.70	2	6.70
	c) 3.6 – 4 kg	1	3.30	2	6.70
6.	**Sex of the baby**				
	a) Male	14	46.70	13	43.30
	b) Female	16	53.30	17	56.70

Table I presents the frequency and percentage of experimental and control group according to demographic characteristics

Age

The age of the sample ranged from 18 to 30 years and above. 16 samples (53.3%) in the experimental group and 14 samples (46.7%) in the control group were in the age group of 18 to 22 years. 12 samples in experimental and 14 samples in the control group were in the age group of 22 to 26 years. 6.7% in the experimental group and 6.7% in the control group were in the age group of 27 to 30 years.

Gestational age

Nine samples (30%) in the experimental group and 17 samples (56.7%) in the control group were in the period of 37 to 38 weeks of gestation. 21 samples in the experimental group and 9 samples in the control group were in the period of 39 to 40 weeks of gestational age.

Gravida

Twenty two samples (73.3%) in the experimental group and 16 samples (53.3%) in the control group were first gravida. 6 samples in the experimental group and 6 samples in the control group were second gravida. In gravida 3 there were 6.7% in the experimental group and 13.3% in the control group respectively.

Parity

In the experimental group 73.3% and 70% in the control group were in the zero parity. 8 samples in the experimental group and 5 samples in the control group belonged to first parity. In the second, there were 4 samples only in the control group.

Weight of the baby

Eighteen samples (60%) in the experimental group and 26 samples (86%) in the control group were having their babies weighing 2500 to 3000 grams. 11 samples in experimental group and 2 samples in the control group were having their babies weighing between 3001 to 3500 grams. Only 1 sample in the experimental group and 2 samples in the control group were having the babies weighing in the range of 3501 to 4000 grams.

Sex of the baby

Fourteen samples (46.7%) in the experimental group and 43.3% in the control group were males and 16 samples in the experimental group and 17 samples in the control group were females.

SECTION – II

ASSESSMENT OF PHYSIOLOGICAL PARAMETERS OF NEWBORN

TABLE – II

FREQUENCY AND PERCENTAGE DISTRIBUTION OF NEWBORN BABIES IN EXPERIMENTAL AND CONTROL GROUP ACCORDING TO PARAMETERS OF APGAR SCORE AT 1ST AND 5TH MINUTE

N = 60

Sl. No	Parameters of APGAR score	Experimental group N=30				Control group N=30			
		1st min		5th min		1st min		5th min	
		F	%	f	%	f	%	F	%
1.	**Appearance**								
	a. Blue or pale	-	-	-	-	2	6.70	-	-
	b. Bodypink, extremities blue	26	86.70	3	10.00	28	93.30	22	73.30
	c. Completely pink	4	13.30	27	90.00	-	-	8	26.70
2.	**Heart rate**								
	a. Absent	-	-	-	-	-	-	-	-
	b. <100 bpm	-	-	-	-	21	70.00	-	-
	c. >100 bpm	30	100.00	30	100.00	9	30.00	30	100.00
3.	**Respiratory effort**								
	a. Absent	-	-	-	-	-	-	-	-
	b. Slow, irregular	-	-	-	-	26	86.70	-	-
	c. Good, crying	30	100.00	30	100.00	4	13.30	30	100.00

Table II presents the frequency and percentage of parameters of APGAR score in 1st and 5th min in experimental and control group

In the experimental group, in majority of the samples 26 (86.7%) the appearance at 1st minute was body pink and extremities blue. After 5 minutes only 3 samples remained with the same appearance. In experimental group 4 and 27 samples were completely pink in 1st and 5th minute respectively.

In the control group 2 samples at 1st min were completely blue. 28 samples at 1st minute and 22 samples at 5th minute were appeared body pink and blue extremities.

In experimental group the heart rates of all the samples were more than 100 bpm at 1st and 5th minute. In control group for 21 samples, the heart rate was less than 100 bpm and for 9 samples it was more than 100 bpm. At 5th minute all the samples of control group had heart rate more than 100 bpm.

In the experimental group all the 30 babies made good respiratory effort and cried at 1st and 5th minute. Where as in the control group only 4 babies made good respiratory effort and cried at 1st minute, 26 babies (86.7%) had slow, irregular respiratory effort. By 5 minutes all the babies in the control group cried well and showed good respiratory effort.

So, in experimental group all the babies showed better improvement in parameters (appearance, heart rate and respiratory effort) of APGAR score when compared to control group.

TABLE – III

FREQUENCY AND PERCENTAGE OF NEWBORN BABIES IN EXPERIMENTAL AND CONTROL GROUP ACCORDING TO LEVEL OF APGAR SCORE AT 1ST AND 5TH MINUTE AFTER BIRTH

N = 60

Sl. No	Level of APGAR score	Experimental group N=30				Control group N=30			
		1st min		5th min		1st min		5th min	
		F	%	F	%	f	%	f	%
1.	No difficulty	30	100.00	30	100.00	28	93.30	30	100.00
2.	Moderate difficulty	-	-	-	-	2	6.70	-	-
3.	Severe difficulty	-	-	-	-	-	-	-	-

Table III presents the frequency and percentage of level of APGAR at 1st and 5th minute score in experimental and control group

According to the level of APGAR score in experimental group all the samples had no difficulty and adjusted to the extra uterine life at 1st and 5th minute. And in control group 28 samples had no difficulty only 2 samples had moderate difficulty.But at 5th minute all the newborn babies had no difficulty and adjusted to extra uterine life.

Figure 2 shows level of APGAR score of experimental and control group at 1st minute after birth

Figure 3 shows level of APGAR score of experimental and control group at 5th minute after birth

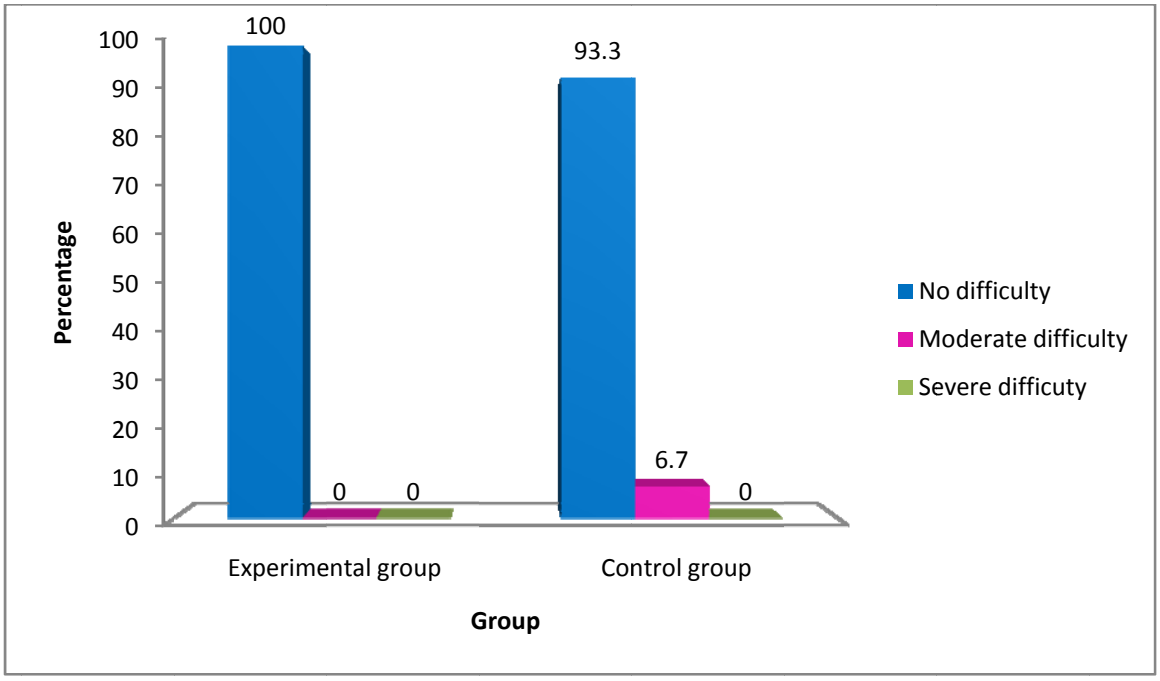

Figure 2 Percentage of experimental and control group according to level of APGAR score at 1st minute

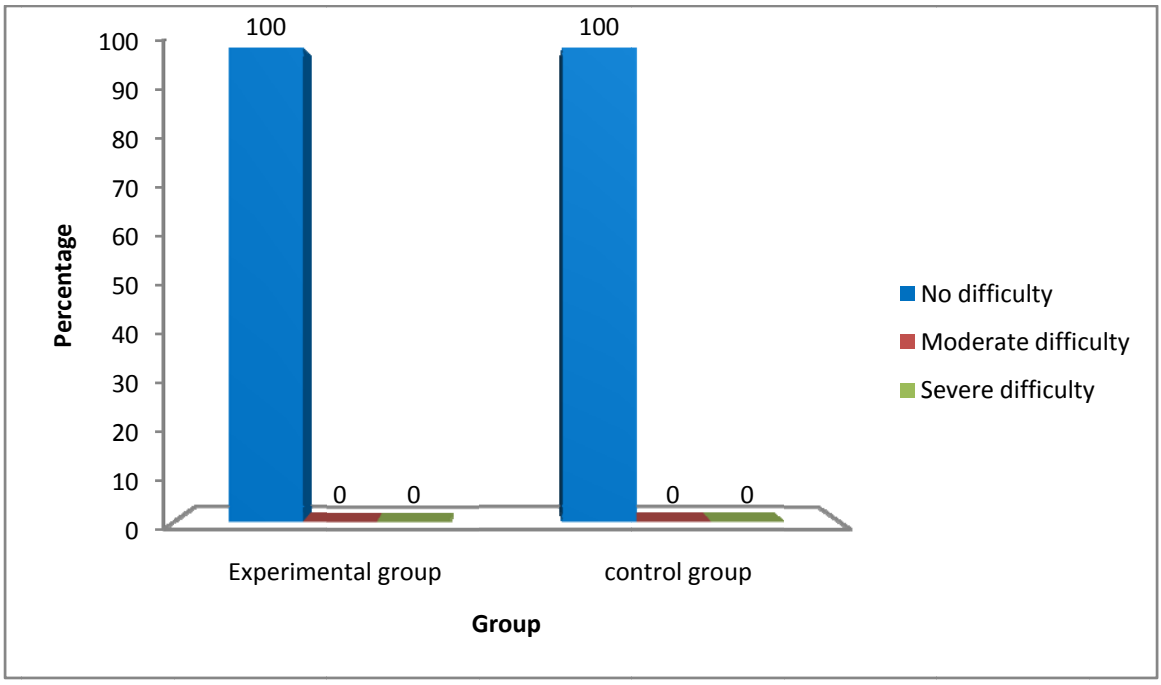

Figure 3 Percentage of experimental and control group according to level of APGAR score at 5th minute

TABLE – IV

MEAN APGAR SCORE AND STANDARD DEVIATION OF EXPERIMENTAL AND CONTROL GROUP AT 1ST AND 5TH MINUTE AND LEVEL OF SIGNIFICANCE

N = 60

APGAR score	Experimental group N=30		Control group N=30		Mean difference	Unpaired 't' value P 0.05 df=58
	Mean score	SD	Mean score	SD		
At 1st min	9.16	0.37	7.10	0.71	2.06	14.03*
At 5th min	10.00	0.00	9.30	0.46	0.70	8.22*

***= Significant.** **Table value=2.000**

Table IV presents the mean APGAR score and standard deviation of experimental and control group at 1st and 5th min and level of significance.

In the experimental group the mean APGAR score at 1st minute was 9.16 and at 5th minute it was 10 and in control group the score was 7.1 and 9.3 respectively.

The statistical test shows that there is a significant difference in the mean APGAR score at 1st min ($t = 14.03$, $df = 58$, $P<0.05$) and at 5th min ($t = 8.22$, $df = 58$, $P<0.05$) between experimental and control group. There was a marked difference in mean APGAR score of experimental and control group, which shows that delayed clamping was effective in improving newborn parameters.

So the research hypothesis **H1:** There is a significant difference between the mean APGAR score of experimental and control group at 1st and 5th minute is accepted

TABLE –V

MEAN APPEARANCE SCORE AND STANDARD DEVIATION OF EXPERIMENTAL AND CONTROL GROUP BASED ON PARAMETERS OF APGAR SCORE AT IST AND 5TH MINUTE AND LEVEL OF SIGNIFICANCE.

N = 60

Parameter of APGAR score	Experimental group N=30		Control group N=30		Mean difference	Unpaired 't' value P 0.05 df=58
	Mean score	SD	Mean score	SD		
Appearance at 1st min	1.13	0.30	0.93	0.25	0.20	2.50*
Appearance at 5th min	1.90	0.30	1.26	0.44	0.64	6.38*

***=Significant.** **Table value=2.000**

Table V presents the mean appearance score and standard deviation of experimental and control group based on parameters of APGAR score at 1st and 5th minute and level of significance.

In the experimental group the mean score of appearance at 1st minute was 1.13 and at 5th minute was 1.9 and in control group the score was 0.93 and 1.26 respectively.

The statistical test shows that there is a significant difference in the mean score of appearance in 1st min and 5th min between experimental and control group ($t = 2.25$, $df = 58$, $P<0.05$) and ($t = 6.38$, $df = 58$, $P<0.05$). On comparison appearance in delayed cord clamping was better than the early cord clamping.

So the hypothesis **H2.a:** There will be a significant difference in the appearance of newborn baby at 1st and 5th between experimental and control group is accepted.

TABLE –VI

MEAN HEART RATE SCORE AND STANDARD DEVIATION OF EXPERIMENTAL AND CONTROL GROUP BASED ON PARAMETERS OF APGAR SCORE AT 1ST AND 5TH MINUTE AND LEVEL OF SIGNIFICANCE.

N = 60

Parameter of APGAR score	Experimental group N=30		Control group N=30		Mean difference	Unpaired 't' value P 0.05 df=58
	Mean score	SD	Mean score	SD		
Heart rate at 1st min	2.00	0.00	1.30	0.46	0.70	8.26*
Heart rate at 5th min	2.00	0.00	2.00	0.00	-	NS

***=Significant** **Table value=2.000**

NS=Non significant

Table VI presents the mean heart rate score and standard deviation of experimental and control group based on parameters of APGAR score at 1st and 5th minute and level of significance.

In the experimental group the mean score of heart rate at 1st minute was 2 and in control group the score was 1.3 and at 5th minute after birth it was 2 both in experimental and control group.

The statistical test shows that there is a significant difference in the mean score of heart rate at 1st min between experimental and control group ($t = 8.26$, $df = 58$, $P<0.05$) and no significant difference at 5th minute.

So the hypothesis **H2.b:** there will be a significant difference in the heart rate of newborn baby in 1st minute between experimental and control group is accepted.

TABLE – VII

MEAN RESPIRATORY EFFORT SCORE AND STANDARD DEVIATION OF EXPERIMENTAL AND CONTROL GROUP BASED ON PARAMETERS OF APGAR SCORE AT 1ST AND 5TH MINUTE AND LEVEL OF SIGNIFICANCE.

N = 60

Parameter of APGAR score	Experimental group N=30		Control group N=30		Mean difference	Unpaired 't' value P 0.05 df=58
	Mean score	SD	Mean score	SD		
Respiratory effort at 1st min	2	0	1.26	2.26	0.74	8.93*
Respiratory effort at 5th min	2.00	0.00	2.00	0.00	-	NS

***=significant** **Table value = 2.000**

NS=Non significant

Table VII presents the mean respiratory effort score and standard deviation of experimental and control group based on parameters of APGAR score at 1st and 5th minute and level of significance.

In the experimental group the mean score of respiratory effort at 1st minute was 2 and in control group the score was 1.26 and at 5th minute it is 2 both in experimental and control group.

The statistical test shows that there is a significant difference in the mean score of respiratory effort at 1st min between experimental and control group ($t = 8.93$, $df = 58$, $P<0.05$) and no significant difference at 5th minute.

Usually the respiratory effort of the baby at 1st minute will be different from the 5th minute, due to resuscitation. Therefore it is difficult to predict delayed cord clamping will have influence on the respiratory effort of the baby.

So the hypothesis **H2.c:** There will be a significant difference in the respiratory effort of newborn baby at 1st minute between experimental and control group is accepted.

TABLE – VIII

FREQUENCY AND PERCENTAGE OF NEWBORN BABIES IN EXPERIMENTAL AND CONTROL GROUP ACCORDING

TO HEMOGLOBIN LEVEL OF NEWBORN

N = 60

S.No	Level of hemoglobin	Experimental group N=30		Control group N=30	
		F	%	F	%
1.	14 – 16 gm/dl	-	-	15	50
2.	17 – 19 gm/dl	13	43.3	15	50
3	20 – 22 gm/dl	17	56.7	-	-

Table VIII presents the frequency and percentage of hemoglobin level of newborn in experimental and control group

In the experimental group 13 samples (43.3%) were in the hemoglobin range of 17 – 19 gm/dl and 17 were in the range of 20 – 22 gm/dl. In control group 15 samples were in both the range of 14 – 16 gm/dl and 17 – 19 gm/dl.

Figure 4 shows percentage of hemoglobin level in experimental and control group.

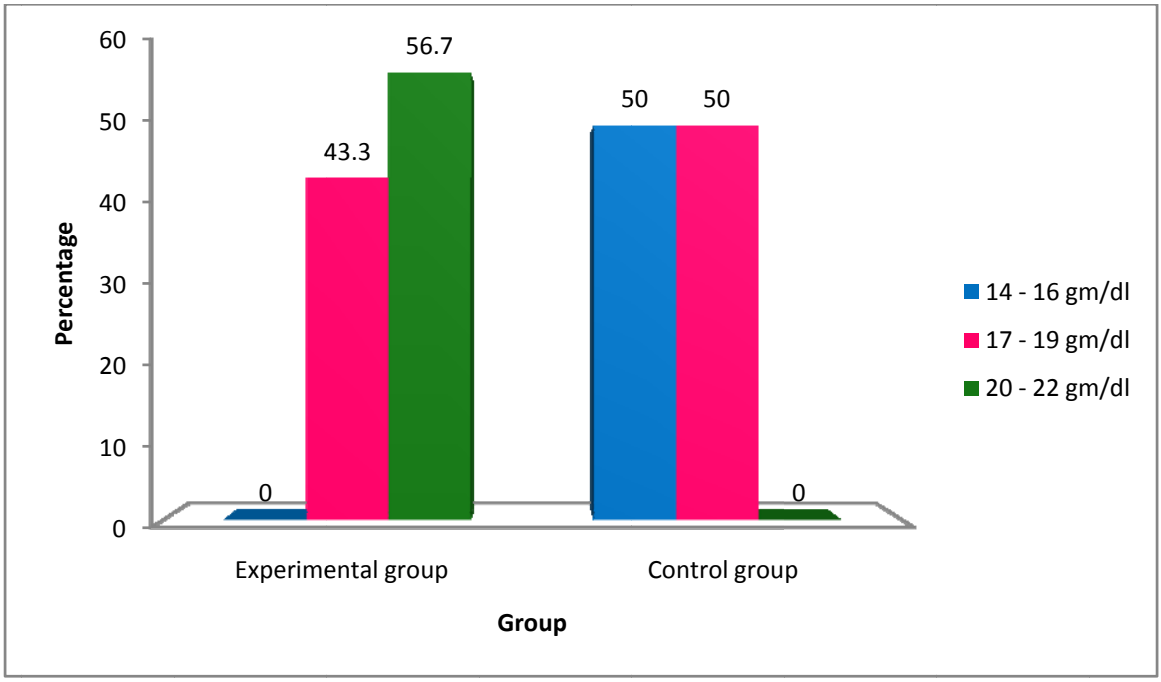

Figure 4 Percentage of experimental and control group according to haemoglobin level of newborn.

TABLE – IX

MEAN HEMOGLOBIN AND STANDARD DEVIATION OF NEWBORN BABIES IN EXPERIMENTAL AND CONTROL GROUP AND LEVEL OF SIGNIFICANCE

N = 60

Group	Hemoglobin level			
	Mean score	**SD**	**Mean difference**	**Unpaired 't' value** **p<0.05**
Experimental	19.96	1.17	3.34	10.69*
Control	16.62	1.24		

***=Significant.** **Table value=2.000**

Table IX presents the mean hemoglobin and standard deviation of newborn babies in experimental and control group and level of significance

In the experimental group the mean score of hemoglobin was 19.96 and in control group the score was16.62.

The statistical test shows that there is a significant difference between the mean value of hemoglobin level of experimental and control group ($t = 10.7$), $df = 58$, $P<0.05$).

The level of hemoglobin was more in the experimental group when compared to control group due to delayed cord clamping.

So the hypothesis **H3**: There will be a significant difference between the mean value of hemoglobin level of the experimental group and control group is accepted.

TABLE - X

FREQUENCY AND PERCENTAGE DISTRIBUTION OF NEWBORNS IN EXPERIMENTAL AND CONTROL GROUP ACCORDING TO PRESENCE AND ABSENCE OF PHYSIOLOGICAL JAUNDICE SYMPTOMS

N=60

Sl. no	Physiological jaundice symptoms	Experimental group N=30						Control group N=30					
		24 hrs		36 hrs		48 hrs		24 hrs		36 hrs		48 hrs	
		F	%	f	%	f	%	f	%	f	%	f	%
1.	Yellowish skin colour												
	a. Present	-	-	5	16.70	6	20.00	-	-	4	13.30	4	13.30
	b. Absent	30	100.00	25	83.30	24	80.00	30	100.00	26	86.70	26	86.70
2.	Yellowish sclera												
	a. Present	-	-	5	16.70	6	20.00	-	-	4	13.30	4	13.30
	b. Absent	30	100.00	25	83.30	24	80.00	30	100.00	26	85.70	26	86.70
3.	Dark colour urine												
	a. Present	-	-	5	16.70	6	20.00	-	-	4	13.30	4	13.30
	b. Absent	30	100.00	25	83.30	24	80.00	30	100.00	26	85.70	26	85.70

Table 10 presents frequency and percentage distribution of newborns in experimental and control group according to the presence of physiological jaundice symptoms

At 24 hours no babies had the symptoms of physiological jaundice (yellowish skin, yellowish sclera and dark color urine) both in experimental and control group. At 36 and 48 hours only 4 – 6 samples had the symptoms of physiological jaundice and 24 – 26 samples did not show any symptoms of physiological jaundice in both experimental and control group.

In this study, the time taken for the delayed cord clamping was 2 minutes which is within the normal limit. In early cord clamping the cord is clamped soon after the birth of the baby. Therefore the findings for symptoms of physiological jaundice were found to be similar in both the groups.

SECTION– III

ASSOCIATION OF SELECTED DEMOGRAPHIC CHARACTERISTICS OF CONTROL GROUP WITH HEMOGLOBIN LEVEL OF NEWBORN

N = 30

Sl. No	Demographic characteristics	Level of haemoglobin of newborn				X^2 p 0.05	Table value Degree of freedom
		14 - 16 gm/dl		17 – 19 gm/dl			
		F	%	f	%		
1.	**Age of mother**						
	a. 18 – 21 yrs	9	30.00	5	16.67		df=2
	b. 22 – 26 yrs	4	13.33	10	33.33	6.35*	5.99
	c. 27 – 30 yrs	2	06.67	-	-		
2.	**Gestational age in weeks**						
	a. 37 – 38	9	30.00	8	26.67	0.14	df=1
	b. 39 – 40	6	20.00	7	23.33	NS	3.84
3.	**Gravida**						
	a. Gravida 1	9	30.00	7	23.33		
	b. Gravida 2	2	06.67	4	13.33	2.34	df=2
	c. Gravida 3	4	13.33	4	13.33	NS	5.99
4.	**Sex of the baby**						
	a. Male	4	13.33	9	30.00	3.53	df=1
	b. female	11	36.67	6	20.00	NS	3.84
5.	**Weight of the baby**						
	a. 2.5 – 3 kg	13	43.33	13	43.33	5.04	df=2
	b. 3.1 – 3.5 kg	0	-	2	06.67	NS	5.99
	c. 3.6 – 4 kg	2	06.67	-	-		

***significant** **NS = Non significant**

Table – 11 presents the frequency and percentage distribution of samples showing association with the selected demographic variables with the overall level of hemoglobin.

The association between the demographic variables and hemoglobin level – gestational age, gravida, sex and weight of the baby had no association with the hemoglobin level. But age shows an association with the hemoglobin level. Statistically it shows 6.35 (table value = 5.99).

The babies who born to the mothers with age between the 22 – 26 yrs had high hemoglobin value that was 10 samples (33.33%) were in the level of 17 – 19 gm/dl.

CHAPTER – V

DISCUSSION

The purpose of the present study was to assess the effect of delayed cord clamping on physiological parameters of full term babies born by vaginal delivery in selected hospital at Coimbatore. This chapter presents the main findings and its discussions.

1. Level of APGAR score of newborn

Table II explains the frequency and percentage of parameters of APGAR score in 1st and 5th min in experimental and control group. In the control group, majority of the samples 26 (86.7%) the appearance at 1st minute was body pink and extremities blue. After 5 minutes only 3 samples remains with the same appearance. In control group for 21 samples, the heart rate was less than 100 bpm and for 9 samples it was more than 100 bpm. At 5th minute all the samples of experimental and control group had heart rate more than 100 bpm. In the experimental group all the 30 babies made good respiratory effort and cried at 1st and 5th minute. Where as in the control group only 4 babies made good respiratory effort and cried at 1st minute, 26 babies (86.7%) had slow, irregular respiratory effort. By 5 minutes all the babies in the control group cried well and showed good respiratory effort.

Table III explains the frequency and percentage of level of APGAR at 1st and 5th minute score in experimental and control group. In experimental group the APGAR score was found better than control group. Statistically it shows that in experimental group all the samples had no difficulty and adjusted to the extra uterine life at 1st and 5th minute, where as in control group 28 (93.3%) samples had no difficulty, only 2 (6.70%) samples

had moderate difficulty. But at 5th minute all the newborn babies had no difficulty and adjusted to extra uterine life.

Table IV explains the mean APGAR score and standard deviation of experimental and control group at 1st and 5th min and level of significance. The mean APGAR score was found significantly high at 1st minute in experimental group whereas in the control group it was low. Here the data suggests that in the experimental group the mean APGAR score at 1st minute was 9.16 and at 5th minute it was 10 and in control group the score was 7.1 and 9.3 respectively. So there was significant difference between mean APGAR score at 1st and 5th minute between experimental and control group.

Table V explains the mean appearance score and standard deviation of experimental and control group based on parameters of APGAR score at 1st and 5th minute and level of significance. The mean appearance score was found improved in experimental group both at 1st and 5th minute. Here the data suggests that the mean score of appearance at 1st minute was 1.13 and at 5th minute was 1.9 and where as in control group the score was 0.93 and 1.26 respectively. So there was significant difference between mean appearance score at 1st and 5th minute between experimental and control group.

Table VI explains the mean heart rate score and standard deviation of experimental and control group based on parameters of APGAR score at 1st and 5th minute and level of significance. Only at 1st minute the mean heart rate score was improved in the experimental group when compared to the control group. Here the data suggests that mean score of heart rate at 1st minute was 2 in experimental and 1.3 in control group and at 5th minute it was 2 both in experimental and control group. So there was significant difference in mean heart rate score only at 1st minute between experimental and control group.

Table VII explains the mean respiratory effort score and standard deviation of experimental and control group based on parameters of APGAR score at 1st and 5th minute and level of significance. Only at 1st minute the mean appearance score of experimental and control group were different, whereas at 5th minute the appearance score of both the group were same. Here the data suggests that in experimental group mean score of respiratory effort at 1st and 5th minute was 2 and in control group the score was 1.26 at 1st minute and it was increased to 2 at 5th minute. So there was difference in the mean heart rate score between experimental and control group only at 1st minute.

2. Level of haemoglobin of newborn

Table VIII explains the frequency and percentage of hemoglobin level of newborn in experimental and control group. In the experimental group majority of the samples (56.7%) had the haemoglobin level of 20 – 22gm/dl and rest (43.3%) had the haemoglobin level of 17 – 19gm/dl. In the control group the equal number of samples (50%) had either 14 – 16gm/dl or 17 – 19 gm/dl.

Table IX explains the mean hemoglobin and standard deviation of newborn babies in experimental and control group and level of significance. The mean score of haemoglobin in experimental group was higher (19.96), than the mean score of haemoglobin value in control group (16.62). So there was significant difference in the mean hemoglobin value between experimental and control group.

The present study findings are supported by a comparative study done by **McDonald SJ and Middleton P, (2008)** to assess effect of timing of umbilical cord clamping of term infants on maternal and neonatal outcomes. The results of the study showed that there was no significant differences between early and late cord clamping on postpartum haemorrhage or severe postpartum haemorrhage in any of the sample. For neonatal outcomes, there was a significant increase in newborn haemoglobin levels in the late cord clamping group compared with early cord clamping (mean difference 2.17 g/dL). Infant ferritin levels remained higher in the late clamping group than the early clamping group at six months

3. Symptoms of physiological jaundice of newborn

Table X explains frequency and percentage distribution of newborns in experimental and control group according to the presence of physiological jaundice symptoms. There was no difference observed in the symptoms of physiological jaundice at 24, 36 and 48 hrs among the experimental and control group. At 24 hours no babies had the symptoms of physiological jaundice (yellowish skin, yellowish sclera and dark color urine) both in experimental and control group. After 36 to 48 hrs 4 – 6 samples (13.3% - 20%) had the symptoms of physiological jaundice in both the groups

4. Association of study variables and demographic variables of control group

Table XI explains the frequency and percentage distribution of samples showing association with the selected demographic variables with the overall level of hemoglobin. The association between the demographic variables and hemoglobin level – gestational age, gravida, sex and weight of the baby had no association with the hemoglobin level. The association was found only with the age and overall level of haemoglobin (χ^2=6.35, df=2, P<0.05).

The findings of the present study suggest that delayed cord clamping will improve the APGAR score and haemoglobin level of newborn.

CHAPTER – VI

SUMMARY, FINDINGS, CONCLUSION, IMPLICATION AND RECOMMENDATION

This chapter presents the summary of the study, summary of the findings, conclusion, implication and recommendation.

SUMMARY OF THE STUDY

The main aim of the study was to assess the effect of delayed cord clamping on physiological parameters of term newborn babies compared to early clamping.

The conceptual framework of the study was based on the modified Kurt Zadek Lewin's change theory (1930). The research design used in this study was quasi experimental two group design. The independent variable of the study was delayed cord clamping and physiological parameters of newborn babies were dependent variables.

The study was conducted in a selected hospital at Coimbatore. The data collection period was 45 days. Convenient sampling technique was adopted for the selection of the sample. The total sample of the study consisted of 60 parturient mothers having gestational weeks of 37 – 40 and admitted in the labour ward for delivery. The data was collected by using interview schedule, observation schedule and observation checklist. The reliability of the tool was established by inter rater method. The data was analyzed using descriptive and inferential statistics.

SUMMARY AND FINDINGS

Demographic data

Presents the demographic characteristics of experimental and control group. In experimental group 53.3% were in the age group of 18 – 21 years. 70 % were in 39 – 40 gestational weeks. 22 members were 1st gravida. 60 % of babies were in the weight of 2.5 – 3 kg. 53.3% of babies were female.

In control group 56.7% were in 39 – 40 weeks. 53.3% were 1st gravida. 86.7% of babies were in the weight of 2.5 – 3 kg. 56.7% of babies were female.

APGAR score in experimental and control group

In the experimental group, in majority of the samples 26 the appearance at 1st minute was body pink and extremities blue. After 5 minutes only 3 samples remains with the same appearance. In experimental group 4 and 27 samples were completely pink in 1st and 5th minute respectively. In the control group 2 samples at 1st min were completely blue. 28 samples at 1st minute and 22 samples at 5th minute appeared body pink and blue extremities.

In experimental group the heart rates of all the samples were more than 100 bpm at 1st and 5th minute. In control group for 21 samples, the heart rate was less than 100 bpm and for 9 samples it was more than 100 bpm. At 5th minute all the samples of control group had heart rate more than 100 bpm.

In the experimental group all the 30 babies made good respiratory effort and cried at 1st and 5th minute. Where as in the control group only 4 babies made good respiratory effort and cried at 1st minute, 26 babies (86.7%) had slow, irregular respiratory effort. By 5 minutes all the babies in the control group cried well and showed good respiratory effort.

Level of haemoglobin in experimental and control group

In the experimental group 43.3% of samples had hemoglobin in the range of 17 – 19 gm/dl and 56.7% were in the range of 20 – 22 gm/dl. In control group 50% samples had haemoglobin in both the range of 17 – 19 gm/dl and 50% in the range of 20 – 22 gm/dl.

Symptoms of physiological jaundice in experimental and control group

At 24 hours no babies developed the symptoms of physiological jaundice (yellowish skin, yellowish sclera and dark color urine) both in experimental and control group. At 36 and 48 hours only 4 – 6 samples had the symptoms of physiological jaundice and 24 – 26 samples did not show any symptoms of physiological jaundice in both experimental and control group.

Association of study variables and demographic variables.

The association between the demographic variables and hemoglobin level – gestational age, gravida, sex and weight of the baby had no association with the hemoglobin level. But age showed an association with the hemoglobin level.

SIGNIFICANT FINDINGS

There was a significant difference in mean APGAR score at 1^{st} and 5^{th} minute between experimental and control group ($t=14.03$ at 1^{st} min and $t=8.22$ at 5^{th} min, $p<0.05\%$, df-58). Hence the research hypothesis H1 was accepted at 0.05 level of significance.

There was a significant difference in the mean appearance score of newborn baby at 1^{st} and 5^{th} minute between experimental and control group ($t=2.5$ at 1^{st} min and $t=6.38$

at 5th min, p<0.05, df-58). Hence the research hypothesis H2.a was accepted at 0.05 level of significance.

There was a significant difference in the men heart rate of newborn baby at 1st minute between experimental and control group (t=8.26, p<0.05, df-58). Hence the research hypothesis H2.b was accepted at 0.05 level of significance.

There was a significant difference in the mean respiratory effort of newborn baby at 1st minute between experimental and control group (t=8.93, p<0.05, df-58). Hence the research hypothesis H2.c was accepted at 0.05 level of significance.

There was a significant difference in the mean haemoglobin value of newborn baby between experimental and control group (t=10.69, p<0.05, df-58). Hence the research hypothesis H3 was accepted at 0.05 level of significance.ss

CONCLUSION

From the findings it is quite evident that the delayed cord clamping has an effect on physiological parameters of newborn. It increases the haemoglobin level and improves the APGAR score of newborn. Statistically there was a significant difference between the experimental and control group.

IMPLICATION

The study has its implication in Nursing practice, Nursing Education and Nursing Administration.

Nursing practice

Nurses play an important role in patient care. The findings of the study indicates that all the health team members should be encouraged to follow the delayed cord clamping method while conducting delivery which will improve the physiological parameters of newborn.

Nursing education

The importance of delayed cord clamping can be taught to the nursing staff and students through ward teaching and staff development programme. This will bring the quality practice in maternity care and thereby reducing the infant mortality rate.

Nursing administration

Institution providing maternity services should encourage the nursing staff and nursing students in taking part in quality practice. Nurse administrator should encourage the delayed cord clamping while conducting delivery to improve the physiological status of the newborn, because it is safe, noninvasive and not requiring any effort, cost or equipments and this is relevant in rural areas. And also she should be efficient in organization of programme regarding newer practices in conducting delivery and she can frame the procedure manual regarding the conduction of delivery.

RECOMMENDATION:

- The study can be replicated for large sample and generalization.
- A similar type of comparative study can be conducted on other physiological parameters of newborn.

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APPENDIX – i

LETTER REQUESTING PERMISSION TO CONDUCT STUDY

To

The Dean,

Coimbatore Medical College Hospital,

Coimbatore.

Respected Sir/Madam,

Sub: letter requesting permission for conducting the study

30104623 is post graduate nursing student of our institution. She has selected the below mentioned topic for her research project to be submitted to Dr. MGR Medical university of health science, as a partial fulfilment of Master of Science in Nursing Degree.

"A study to assess the effect of delayed cord clamping on physiological parameters of full term babies born by vaginal delivery in selected hospital at Coimbatore".

Regarding this project, she is in need of your esteemed help and co-operation as she is interested in conducting a study of her project, in the hospital during the month of September. I request you to kindly permit her t conduct the proposed study and provide her the necessary facilities.

The student will furnish details of the study, if required. Please do the needful and oblige.

Thanking You,

Yours faithfully,

PRINCIPAL

Place:

Date:

APPENDIX – ii

REQUISITION LETTER FOR CONTENT VALIDITY

From

30104623
M.Sc(N), Student,
R.V.S. College of Nursing,
Sulur, Coimbatore.

To

Through the principal,

Respected Madam,

Sub: Letter requesting opinion and suggestion of experts for establishing content validity of the tool.

I am a M.Sc(N) Student in R.V.S. College of Nursing, Sulur, Coimbatore in the specialty of Obstetrics and Gynaecology Nursing. As per the requirement for the fulfilment of the Nursing Degree under Tamil Nadu Dr. MGR Medical University. I have selected the following topic for dissertation.

"A study to assess the effect of delayed cord clamping on physiological parameters of full term babies born by vaginal delivery in selected hospital at Coimbatore".

I kindly request you to go through the research tool and validate against criteria given in the sheet.

Thanking you

Yours faithfully,

Enclosure: 30104623

1. Objectives of the study
2. Hypothesis
3. Description of the tool
4. Research tool
5. Criteria rating for validation
6. Content validation certificate.

Place:

Date:

APPENDIX – iii

CERTIFICATE FOR CONTENT VALIDITY

This is to certify that the tool developed by 30104623, II year M.Sc Nursing student, R.V.S College of nursing, R.V.S Educational trust, Sulur, Coimbatore, to collect data on the problem,

"**A study to assess the effect of delayed cord clamping on physiological parameters of full term newborn babies born by vagina delivery in a selected hospital, at Coimbatore.**"

Is validated by the undersigned and she can proceed with this tool to conduct the main study.

Name & Address:

Signature:

Seal:

Date:

APPENDIX – iv

EVALUATION CRITERIA RATING SCALE FOR VALIDATING THE TOOL

INSTRUCTION

The expert is requested to go through the following criteria for evaluation rating scale regarding clarity, relevancy, adequacy, and remark.

S.No	Items	Clarity	Relevancy	Adequacy	Remark
	Section – A **Demographic data**				
1.					
2.					
3.					
4.					
	Section – B **Observation schedule to assess the physiological parameters of newborn**				
1.					
2.					
3.					
4.					
5.					
6.					
	Section – C **Observation checklist to assess physiological jaundice in newborn**				
1.					
2.					
3.					

Suggestions:

Name and Signature of Expert:

LIST OF EXPERTS

Medical Experts

1. **Dr. Latha Prasanna,**
   Consultant Obstetrician and Gynaecologist,
   R.V.S. Hospital, Sulur. _____

2. **Dr. Selvi Palvannan,**
   Consultant Neonatologist,
   R.V.S. Hospital, Sulur. _____

Nursing Experts

3. **Prof. S.P. Latha,**
   Principal,
   R.V.S. College of Nursing,
   Kannampalayam. _____

4. **Prof. Kalpana Jayaraj,**
   Principal,
   Annai Meenakshi College of Nursing,
   Coimbatore. _____

5. **Mrs. Jessy Rani. P,**
   Associate Professor,
   R.V.S. College of Nursing,
   Sulur, Coimbatore. _____

APPENDIX – v

REQUISITION LETTER FOR CO-GUIDE

From,

30104623,

MS.c (N) student,

R.V.S College of Nursing,

Sulur, Coimbatore.

To,

Dr. Latha Prasanna,

Consultant Obstetrician and Gynaecologist,

R.V.S. Hospital, Sulur.

Through the principal

Respected madam,

Sub: request for co-guide

I wish to state that 30104623 Master of nursing student of R.V.S college of Nursing, Sulur, Coimbatore in the specialty of obstetrics and gynaecological Nursing. As per the requirement for partial fulfilment of the Nursing Degree under the Dr. M.G.R Medical University, I have selected the following topic for the dissertation.

"A study to assess the effect of delayed cord clamping on physiological parameters of full term babies born by vaginal delivery in selected hospital at Coimbatore".

Regarding this I am in need of your valuable help and co-operation by providing services to be a Co Guide for my study.

I humbly request your good self to consider the same and do the needful.

Thanking you

Yours faithfully,

30104623

Date:

Place:

APPENDIX – vi

RESEARCH TOOL

INTERVIEW SCHEDULE

INTRODUCTION

The umbilical cord is often clamped immediately or within the first 15 s after delivery of the baby. But in delayed cord clamping there is a transfer of blood from the placenta of about 80 ml of blood at 1 min after birth, reaching about 100 ml at 3 min after birth. So the investigator is interested to find the effect of effect of early and delayed cord clamping on physiological parameters of full term babies born by vaginal delivery in selected hospital.

PURPOSE

The purpose of the tool is to find out the effect of early and delayed cord clamping on physiological parameters of full term babies born by vaginal delivery in selected hospital.

INSTRUCTION

Kindly give the correct answer and answer will be confidential.

PART - I
DEMOGRAPHIC VARIABLES

Sample No:

1. Age in yrs
    a. 18 – 21
    b. 22 – 26
    c. 27 – 30
    d. More than 30

2. LMP
3. EDD
4. Gestational age
5. Gravida
    a. Gravida 1
    b. Gravida 2
    c. Gravida 3
    d. More than 3 Gravida
6. Parity
    a. Parity 0
    b. Parity 1
    c. Parity 2
    d. More than 2 parity
7. Blood group of the mother :
8. Sex of the baby
    a. Male
    b. Female
9. Weight of the baby
    a. 2.5 to 3 kg
    b. 3.1 to 3.5 kg
    c. 3.6 to 4 kg

PART – II

OBSERVATION SCHEDULE FOR ASSESSING

PHYSIOLOGICAL PARAMETERS OF THE NEWBORN BABY

PARAMETERS	TIMING OF OBSERVATION	
	1st min after delivery	5th min after delivery
Heart rate		
Respiratory effort		
Muscle tone		
Reflex irritability		
Appearance		
Total score		

Scoring

1. Heart rate

   Absent – 0

   <100 bpm – 1

   >100 bpm – 2

2. Respiratory effort

   Absent – 0

   Slow, irregular – 1

Good, crying – 2

3. Muscle tone

Flaccid – 0

Some flexion of extremities – 1

Active motion – 2

4. Reflex irritability

No response – 0

Grimace – 1

Vigorous cry – 2

5. Appearance

Blue, pale – 0

Body pink, extremities blue – 1

Completely pink

Description of the tool:

Total APGAR for a normal newborn is 7 to 10

0 – 3 : severe distress

4 – 6 : moderate difficulty

7 – 10: no difficulty, adjusting to extra uterine life

PART – III

OBSERVATION SCHEDULE FOR ASSESSING HAEMOGLOBIN LEVEL OF THE NEWBORN BABY

Sample No	Haemoglobin level in mg/dl	
	In early cord clamping	In delayed cord clamping

PART – IV

OBSERVATION CHECK LIST FOR ASSESSING

PHYSIOLOGICAL JAUNDICE OF THE NEWBORN BABY

Signs of physiological jaundice	Timing of observation after delivery					
	24 hrs		36 hrs		48 hrs	
	Present	Absent	Present	Absent	Present	Absent
Yellowish skin						
Yellowish sclera						
Dark colour urine						

SCORING:

Present - 1

Absent - 0

From

Ms. N. Kalai Selvi, M.A., M.Phil,
P.hD, Senior Lecturer, Department
of English,

Oxford Engineering College,
Tiruchirappalli - 620 009 .

To

Mrs. Kanagavalli .G,
MSC II-Year,
RVS College of Nursing,
Coimbatore,

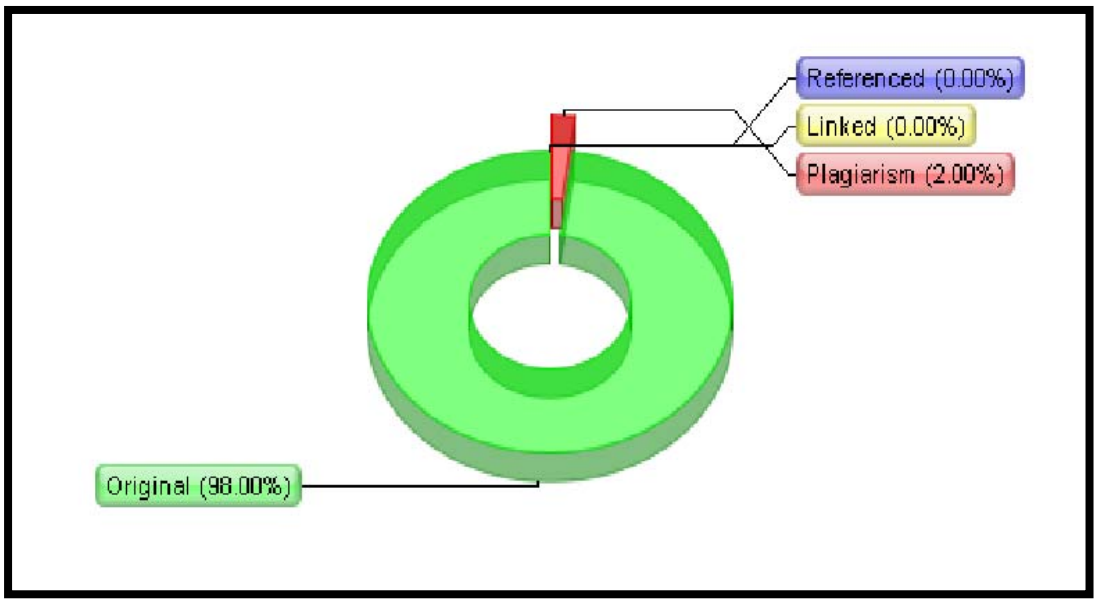
This is to certify that, I have done English editing on the research project of Mrs.Kanagavalli. G. on topic "A STUDY TO ASSES THE EFFECT OF DELAYED CORD CLAMPING ON PHYSIOLOGICAL PARAMETERS OF FULL TERM BABIES BORN BY VAGINAL DELIVERY IN A SELECTED HOSPITAL IN COIMBATORE". I have found it satisfactory and wish her success for the future ahead.

(Ms. N. Kalai Selvi)

Yours Faithfully,

APPENDIX – viii

PLAGARISM REPORT USING PLAGARISM DETECTOR



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